Hayashi et al. and Murthy and further in view of Norton; and claim 19 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hayashi et al. and further in view of IEEE 100: The Authoritative Dictionary of IEEE Standard Terms (seventh edition, page 504) (hereinafter, "IEEE").

Applicants respectfully traverse the Examiner's rejections to the extent they are maintained.

Turning to the subject Office Action, and more specifically to the rejection of independent claim 1, this claim generally recites a method of communicating between nodes in a clustered computer system. The method includes communicating a port identifier from a first node to a second node coupled to the first node over a point-to-point network, wherein the first node includes a plurality of network ports and a plurality of communication registers, wherein each communication register is dedicated to an associated network port among the plurality of network ports and is configured to store data received over such associated network port, and wherein the port identifier identifies a network port among the plurality of network ports to which the second node is coupled to the first node. The method also includes communicating data from the second node to the first node by initiating a write operation on the first node using the second node to store the data in the communication register associated with the network port identified by the port identifier.

Of note, therefore, claim 1 is a method of communicating between nodes in a clustered computer system, wherein a first node is coupled to a second node via a point-to-point network, and where the first node includes a plurality of network ports.

In rejecting claim 1, the Examiner relies on Hayashi; however, it is unclear from the Examiner's arguments as to which particular structures in Hayashi correspond to nodes, point-to-point networks, and network ports. More fundamentally, Applicants can find no disclosure in Hayashi directed to clustered computer systems.

Hayashi is directed to a switched-based network for coupling together processors in a parallel computer system, and as such, is utilized in a single computer system. Claim 1, on the other hand, is directed to connecting together multiple computers, or nodes, in a clustered computer system (see Background of Invention for discussion of clustering). Hayashi's use of the term "cluster" refers to groups of processors in a single computer, rather than multiple computers.

Furthermore, it is unclear what the Examiner considers to be a "node" in Hayashi. As defined on page 1, lines 7-8 of the Application, a node in a clustered computer system is a computer. It appears, however, that the Examiner is analogizing nodes to individual switches in a multi-stage switch. These switches are not "nodes in a clustered computer system" as required by claim 1, and as a result, Hayashi does not anticipate claim 1.

The Examiner may argue that the fact that the claimed nodes are defined as being in a clustered computer system in the preamble negates consideration of this feature. However, even were the Examiner's interpretation of a "node" used, Hayashi would still fail to anticipate claim 1.

In particular, claim 1 requires that a first node communicate a port identifier to a second node. The Examiner relies on Fig. 13, item 162 for allegedly teaching this concept. However, Hayashi never communicates a port identifier between one switch to another switch. Instead, as should be apparent from item 162 of Fig. 13, as well as from a review of Figs. 11 and 12, Hayashi relies on the fact that incoming data is received over a particular port "IX"to determine the source of the data. Each switch in the embodiment of Fig. 13 includes three input ports, an "IX" port, an "IY" port and an "IP" port, as well as three output ports, an "OX" port, an "OY" port and an "OP" port. It is the port over which data is received, rather than any communicated data in the packet, that indicates (if at all) any source information.

Hayashi does communicate address information over each switch, however, it is important to note that this address information relates to the destination of a packet, rather

than source information. As such, there is no disclosure in Hayashi directed to communicating from a first node to a second node a port identifier that indicates to the second node to which of a plurality of network ports on the first node the second node is coupled.

In addition, claim 1 recites both that the first node communicates a port identifier to a second node that identifies a network port to which the second node is coupled to the first node, and that the second node communicates data to the first node by initiating a write operation on the first node to store data in a communication register associated with the network port identified by the port identifier. It is important to note, therefore, that claim 1 requires that one structure corresponding to a first node communicate a port identifier to another structure corresponding to a second node, and that the structure corresponding to the second node communicate data back to the structure corresponding to the first node, i.e., for a given pair of nodes, data is communicated in both directions.

The Examiner cites passages and figures from Hayashi that are directed to different embodiments (e.g., Figs. 6, 7A, 9A and 13), but of note, in each of these embodiments, data communication occurs in one direction between any pair of switches. Applicants can find no pair of switches (or other elements) in any embodiment of Hayashi where a port identifier is communicated from one switch to another switch, and where the switch that receives the port identifier then uses that port identifier to communicate data back to the switch that communicated the port identifier.

The Examiner also apparently argues, at the end of paragraph 4 of the Office Action, that Hayashi discloses paragraph (b) of claim 1, the communication of data from a second node to a first node, by providing a configuration of two switching circuits (e.g., each configured as shown in Fig. 7A) connected to one another via their ports. The Examiner apparently asserts that, in such a configuration, the output switch of the first switching circuit corresponds to a second node and the input switch of the second switching circuit corresponds to a first node. By taking such a position, however, the

Examiner's chosen first and second nodes do not meet the limitations of paragraph (a) of claim 1. Specifically, Hayashi would need to also disclose an ability for the input switch of the second switching circuit to communicate a port identifier back to the output switch of the first switching circuit. Hayashi fails to disclose any analogous functionality, and as a result, claim 1 is novel over Hayashi.

Claim 1 is also non-obvious over Hayashi as the Examiner has presented no objective evidence that would motivate one of ordinary skill in the art to modify Hayashi to incorporate the missing functionality. Applicants therefore respectfully submit that claim 1 is also non-obvious over Hayashi. Reconsideration and allowance of claim 1, as well as of claims 2-9 which depend therefrom, are therefore respectfully requested.

Next with respect to the rejection of independent claim 10, this claim generally recites a circuit arrangement which includes a plurality of network ports, each configured to couple a first node from a clustered computer system to another node in the clustered computer system over a point-to-point network; a plurality of communication registers, each dedicated to an associated network port among the plurality of network ports and configured to store data received through such associated network port; and a control circuit coupled to the plurality of communication registers and configured to automatically notify the first node in response to storage of data in any of the plurality of communication registers.

The Examiner also relies on Hayashi in rejecting claim 10. Hayashi, however, is deficient in several regards. First, claim 10 requires a plurality of network ports, each of which configured to couple the same node (a "first node") to another node in a clustered computer system. As noted above in connection with claim 1, Hayashi does not disclose nodes implemented as computers in a clustered computer system. Claim 1 is therefore novel over Hayashi for this reason.

Second, claim 10 requires that a control circuit automatically notify the first node in response to the storage of data in any of a plurality of communication registers that are each dedicated to a particular network port.

In rejecting this claim, the Examiner apparently analogizes the input queues in a switch as shown in Fig. 7A to the communication registers in claim 10. Further, the Examiner argues that, in Fig. 10, the PSTR1 and PSTR2 signals correspond to a control circuit configured to notify a node in response to storage of data in any of a plurality of communication registers.

It is important to note, however, that the PSTR1 and PSTR2 signals are not asserted "in response to the storage of data" in a communication register. Rather, as noted at col. 5, lines 54-58, these signals are asserted "in synchronism with" arrival of a packet to an input port of a switch, and "in parallel with" the packet. It is evident from this disclosure that, while these signals are asserted roughly contemporaneously with storage of data in the input queue, the signals themselves are not asserted "in response to" the storage of data, as would be required to anticipate claim 10.

Claim 10 is therefore novel over Hayashi.

Applicants also assert that claim 10 is also non-obvious over Hayashi, because modifying Hayashi would actually be counterproductive in the Hayashi environment, leading to comparatively slower performance. Were the switch controller of Hayashi required to wait for a signal asserted in response to storage of data in a storage register, rather than receiving a signal contemporaneous with the arrival of a packet (as disclosed in Hayashi), additional delay would be introduced. As noted at col. 2, lines 3-7, the entire focus of Hayashi is upon minimizing delay and maximizing performance. Applicants respectfully submit that one of ordinary skill in the art would not be motivated to modify Hayashi to operate with greater delay. Applicants therefore respectfully submit that claim 10 is also non-obvious over Hayashi. Reconsideration and allowance of claim 10, as well as of claims 11-19 which depend therefrom, are therefore respectfully requested.

Next, with respect to independent claims 20 and 22, each of these claims, similar to claim 10, recites the concept of automatically notifying a node in response to the storage of data in any of a plurality of communication registers, where each communication register is dedicated to an associated network port. As discussed above in connection with claim 10, this feature is not disclosed or suggested by Hayashi. Furthermore, it should be noted that, with respect to claim 20, the claim recites a "node for use in a clustered computer system." Similarly, claim 22 recites "a clustered computer system." As has been noted above, Hayashi is not directed to a clustered computer system, and as such, these claims are also distinguishable from Hayashi for this additional reason. Applicants therefore respectfully submit that claims 20 and 22 are patentable over Hayashi. Reconsideration and allowance of claims 20 and 22, as well as of claim 21 which depends therefrom, are therefore respectfully requested.

As to the dependent claims, Applicants traverse the Examiner's rejections on the basis of their dependency on the aforementioned independent claims. However, Applicants also note that a number of these claims recite additional limitations that further distinguish from the prior art of record. However, in the interest of prosecutorial economy, these claims will not be further addressed herein.

In summary, Applicants respectfully submit that all pending claims are novel and non-obvious over the prior art of record. Reconsideration and allowance of all pending claims are therefore respectfully requested. If the Examiner has any questions regarding the foregoing, or which might otherwise further this case onto allowance, the Examiner may contact the undersigned at (513) 241-2324. Moreover, if any other charges or credits

are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,

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Date

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